Sunday, February 28, 2010

Federal Communications Commission
Washington, DC 20554
Re: Request for comments for WT Dockets 08-166, 08-167 and ET Docket 10-24

Professional Wireless Systems offers comments on many of the questions that the FCC posed in R&O and FNPR 10-16 (FCC 10-16). Professional Wireless Systems (PWS) is one of several small businesses around the country which focuses almost exclusively on enabling customers to use Wireless Audio Devices in an interference free and reliable manner. Our customers rely on us to help design permanent installations and to manage short term installations of wireless audio devices for specific productions.

Background:

PWS was established by Mr. James Stoffo in 1994 to serve the wireless needs of the professional production community. In 2002, the company was acquired by Masque Sound and Recording Corp but a conscious decision was made to retain PWS's unique identity, business model and customer focus. Masque Sound primarily serves theatrical productions while PWS serves a wide variety of customers and concentrates directly on wireless audio devices. This distinction is important in these proceedings because while both Masque Sound and PWS may offer comments in this proceeding, they truly are two separate view points and should not be dismissed as coming from a single entity.

PWS's customer base covers the entire gamut of wireless audio device users in the industry. We have designed and installed wireless intercom systems used at training facilities by the US Marine Corp. We have designed and installed studio wide systems for several broadcast networks and many studios. We have serviced countless television, live audience, special event and corporate theatre events nationwide and abroad. We have served as active members of the SBE and as SBE frequency coordinators in the Central Florida region. We have even sold wireless audio devices and services to other corporate entities involved in these proceedings including both Microsoft and Google. We truly understand the need to protect both the local broadcasters and the needs of our customers for interference free, reliable operation of wireless audio devices. Indeed, in most cases, interference free operation of wireless audio devices directly drives interference protection for local broadcasters.

Comments:

PWS understands and respects the needs of white spaces devices and recognizes the potential, but unproven, utility of these devices for many tasks. However, our comments pertain to the thirty year history of wireless audio device use and are based on our real-world experience in the wireless audio device industry.

¶ 116: "We anticipate that wireless microphones operating up to 50 milliwatts would transmit over a shorter distance. We seek comment on this proposal.

We agree with Lectrosonics[1] that 100 mW would be a better limit for Part 15 operation in the UHF band. The resulting change in range for the 3db increase is minimal. Additionally, so many UHF wireless audio devices from Lectrosonics, Shure, Telex and others have already been manufactured and fielded with the capability to transmit at 100 mW that it would pose an unfair burden on equipment users who would otherwise qualify for Part 15 operations.

We believe that increasing the allowed Part 15 power limit to 100 mW in the UHF band would actually reduce the need for many users to apply for Part 74 licenses. This in turn reduces the administrative load on the FCC. On the other hand, many users in different categories DO require licensing under Part 74 and should be eligible for licenses. Since 50mW is the existing limit in the VHF band for Part 74 licensees, we concur that the Part 15 limit should be the same.

We further believe that external components such as amplifiers should be allowed under Part 74 rules and not permitted under part 15 rules with certain exceptions. Passive antennas and antenna distribution systems should be allowed for multiple Part 15 receivers operating in the same space. Our position is that part 74 users are professional users who understand the engineering and interference aspects of using external devices and have the ability to use such devices appropriately while not exceeding currently defined emission limits. The exception noted for Part 15 will improve the ability of a small system to operate without causing or receiving interference. External devices and amplifiers are used to create distributed antenna systems which allow device operation in various hard to reach locations such as dressing rooms under a stage or in adjacent studios from a single, central equipment room. The use of external amplifiers and devices has been relatively common in the industry in order to reduce antenna system cost and complexity and to extend coverage into hard to reach areas without causing interference complaints.

In our experience, the majority of wireless audio devices are used in facilities that are larger than the 'foot print' of the wireless audio device's transmission range. For instance, wireless audio devices operated on a football field are rarely visible outside the confines of a stadium, even when operating at 250 mW. Operation of wireless audio devices inside a medium sized church are rarely visible beyond the parking lot of the church even when operating at 100 mW.

¶ 116: "We also seek comment on whether license eligibility should be expanded to permit the use of low power auxiliary stations inside nuclear power plants."

And

[1] *See* Comments of Lectrosonics, Inc. to the *Notice of Proposed Rule Making* in ET Docket 10-24 (filed 2/22/2010)

> *¶ 139: "Nuclear Energy Institute and Utilities Telecom Council Petition for Waiver. We note that the Nuclear Energy Institute and Utilities Telecom Council (NEI/UTC) has recently petitioned the Commission for a waiver of the "allocation and licensing provisions"…*

Our position is that 'Power Licensees' should be eligible for licenses to operate wireless audio devices inside nuclear power plants.

Again, the operational 'foot print' of the wireless audio devices comes into play here. In this case, the low power auxiliary stations in question are generally limited to wireless intercom systems. The wireless intercom systems are markedly different from land mobile radio systems in that they provide full duplex communication. Full duplex communication is critical to the safety of the employees who are operating cranes and other heavy machinery. Waiting for a land mobile radio channel to become clear before being able to call 'stop' during a lifting operation would greatly increase the level of danger in these operations. Wired intercoms or telephones would provide the same full duplex capability but would require penetration of personal protective equipment and pose a risk of cable entanglement. The use of wireless intercom systems in these use cases is critical to the safety of both the facility and the personnel performing maintenance.

These wireless intercom (and related) systems are used during maintenance inside the containment vessel of nuclear facilities which by their very nature provide an immense level of attenuation from the outside environment. Indeed, we have been called upon to assist in designing antenna systems to cover hard to reach areas inside the containment vessel because these facilities are just plain difficult to get good internal coverage of wireless intercom systems.

One argument against allowing this type of operation is that it might interfere with licensed part 74 users during a nuclear facility incident. This is simply un-true for the following reasons.

1. Any system operating inside the containment vessel is effectively invisible outside the containment vessel, much less a few hundred feet to the security boundary surrounding containment vessels.
2. Safety regulations and common sense would prevent any authorized part 74 users entering the containment vessel during an incident.
3. Operation of wireless intercom systems are intended for scheduled maintenance downtimes. An incident as envisioned by broadcast Part 74 users would be incompatible with such operations as plant emergency procedures would be in effect.

> *¶ 116: "We seek comment on the extent to which Part 74 eligibility for licensing should be expanded, if we decide to do so."*

And

> *¶ 131: "In this regard, we seek comment on how the Commission could more completely and precisely define the types of additional entities eligible for licensing so*

> *that we can easily implement the licensing criteria that we adopt for entities that merit licensee status while also ensuring that such status is limited to only eligible entities."*

And

> *¶ 133: "We also seek comment on whether we should modify the eligibility requirements for a Part 74 license to include other entities that use wireless microphones, such as […] Do these or other additional entities need interference protection from TV Band Devices that is afforded to Part 74, Subpart H licensees? Or would, instead, the operation of wireless microphones by these and other users effectively be accommodated were they to operate on an unlicensed basis under Part 15, similar to the TV Band Devices?"*

As can be seen by the numerous comments filed in ET docket 10-24, there is a large variety of entities that are interested in becoming licensed under expanded part 74 rules. Some of these entities are performance venues; others are production companies and equipment providers. In some cases the performance venue may own several wireless audio devices (theme parks, houses of worship, schools and 'city hall'), but in most instances the equipment is provided by outside vendors or by individual productions that use a given facility. Our position is that licenses should be applied to owners and operators of wireless audio devices rather than specific venues. If the venue owns wireless audio devices, they would be eligible for licenses as the owner of that equipment, not as a performance location. In all other cases, the needs of a specific production are unique to that production in terms of the quantity, type and intended use of wireless audio devices. Whether the production travels or stays at a single location, the owner or operator of the equipment is best equipped to apply for and maintain equipment licenses. This also removes the burden of licensing multiple visiting productions from the managers of a performance venue and puts the burden on the entity that desires part 74 protections. If the equipment owners determine that part 15 operation is all that is required then the administrative burden on the FCC is also reduced.

The criteria for eligibility of part 74 licenses are much harder questions to answer. While we would be happy to see eligibility opened up we understand the need to balance the criteria and limit the number of part 74 users. We applaud the commission's decision to allow existing wireless audio devices to operate under part 15 rules and encourage the commission to retain this decision going forward. With this in mind and assuming the current part 15 eligibility remains, we propose the following modification to 47 C.F.R. § 74.831:

> ***"The license for a low power auxiliary station authorizes the transmission of cues and orders to production personnel and participants in broadcast programs, motion pictures and live performances and to the preparation therefore, the transmission of program material by means of a wireless audio device worn by a performer and other participants in a program, motion picture and live performance during rehearsal and during the actual broadcast, filming or recording, or the transmission of comments, interviews and reports from the scene of a remote program, broadcast or performance."***

In this case, the addition of Live Performance expands eligibility to house of worship, theatrical, theme park, civic meetings and special event usage which are not broadcast or recorded.

In addition, the holder of the license should be either the producer of a program, motion picture or live performance or the equipment provider who is providing services to producers of programs, motion pictures and live performances.

To expand this reasoning, many producers are focused on content rather than technology. They understand the need for audio reinforcement (speakers, amplifiers etc…) the need for lighting (dimmers, light fixtures, etc…) and the need for many, many other pieces of technology required for a successful program. But they recognize that both the operational expertise and financial investment is better made by companies that specialize in each aspect of production technology. The producer of the production hires equipment and operators from vendors to supply the technical needs. If a producer brings all of these elements 'in-house' then they should be eligible for a part 74 license and indeed are eligible under current rules. However, it's much more common for producers to use outside vendors who also serve other productions over a larger geographic area. Rather than put the burden of licensing on the non-technical producer, the burden should be placed on the technically competent equipment owner/operator who understands and controls the operation of individual equipment items. Thus, a company such as PWS would be eligible and required to obtain a Part 74 license for a specific geographic area (nationwide, multiple state, metro area or specific location) based on their stated service area. This also eases the burden on the licensing system as a licensed provider can support multiple productions in various locales simultaneously. A producer such as a theme park, house of worship, school or theatre that owns its wireless audio devices would be eligible for its own license (by specific location.)

> *¶ 131: "If we were to expand license eligibility, we also seek comment on what modifications we should make to the rules regarding scope of service and permissible transmissions."*

We feel that the commission has already defined the scope of service of wireless audio devices in ¶ 112 of FCC 10-16.

> *¶ 132: "We ask that commenters address the practicability of producers of live arts, sporting events, and religious organizations providing up-to-date information on venues and times of operation to the TV Band Device database on an ongoing basis, and how best to ensure that they do so. We are particularly concerned that licensees may find it impractical to maintain the database with up-to-date information and instead may call for interference protection on all channels on a continuous basis, which could completely block access by TV Band Devices and therefore may lead to less efficient use of the spectrum. We invite comment on this analysis."*

The burden of registering wireless audio devices can certainly become a problem. In fact, it would most certainly be a burden for performance venues who host various itinerant events. The visiting production would be dependent on the performance venue to accurately register equipment and operating frequencies. This would require training for personnel at the production venue as well as a great deal of

communication between the operators, production staff and venue management. It is our position that by extending licensing eligibility to the owner/operator of wireless audio devices, the number of 'middle men' would be greatly reduced. This in turn puts the people who know the current operating frequencies, equipment models and times of use directly in line to register equipment use in a white space database and to respond to communication from database providers.

At PWS, we have already been in contact with several potential white space database providers to discuss API's and web based user interfaces to make the process of registering wireless audio devices easier for owner/operators. We feel that simplifying the process and reducing the amount of time required to submit protection requests will result in more accurate and economical registrations. However, latency between protection requests and action by white space devices may play an important role in the process. The faster that white space devices respond to, and honor protection requests, the more likely that protection requests will only be submitted for the actual times of operation.

Rather than commenting on specific web based user interfaces that are in alpha or beta development states, we have discussed basic elements of information that should be included in the registration requests to WSDB providers. We are concerned that there isn't much incentive for White Space Database providers to expend much effort in developing easy to use web UI's that encourage easy and accurate protection requests. The prototype interfaces that we've seen so far are both difficult to use and lack important information fields. We would be happy to comment on this subject in greater detail and to work with potential or selected WSDB's to help them understand the needs of public white space device users.

> *Touring theatrical and concert productions already do frequency coordinations for their shows days before arriving at a new venue. Registering those frequencies for the upcoming date and time simultaneously is both logical and beneficial to all users of the TV Band Device database. ¶ 134: "We seek to balance the needs of potential new classes of wireless microphone licensees with other users of the TV bands. […] If we were to expand Part 74, Subpart H to include all of the existing users and applications, the eligibility would be expanded so extensively that virtually anyone would be eligible for a license. […] This expansion would significantly increase the number of Part 74 licensees submitting information for inclusion in the TV Band Device database, thus increasing the cost and complexity of operating the database. We invite comment on this analysis and the impact of expanding eligibility on the viability of TV Band Devices."*

This analysis appears to indicate that Part 15 users would not be eligible to submit protection requests in the WSDB. If this is the case, then many more wireless audio device users will need to request licenses from the FCC which will greatly increase the administrative burden. On the other hand, additional registrations in WSDB's are generally limited to a several rows of data, each consisting of a few fields. With web and API based registration mechanisms, the burden of registration rests on the wireless audio device user, not the WSDB provider. At the WSDB side of the transaction, the entire

process is automated and storage requirements are low. We don't believe that additional registrations will materially impact the cost or complexity of WSDB operations.

> *¶ 135: "We note that any expansion of the Part 74 license eligibility will have an impact on the primary users of the TV bands (e.g., TV broadcasting stations) as well as on unlicensed wireless microphones and TV Band Devices that will be introduced in the future. Is it practical for newly eligible users to comply with all of the Part 74 requirements that apply to existing eligibles, such as the requirement to coordinate frequencies? How might an expansion of eligibility affect the viability of frequency coordination for all of the existing eligible users? Should we place any additional requirements or limitations, for example, on the amount of spectrum that can be used in a given location by the newly eligible users? …"*

For most professional wireless audio device users, frequency coordination is of paramount importance. In order to provide reliable, interference free operation of wireless audio devices, we must avoid accepting interference as well as avoid causing interference. One of the reasons that the wireless audio device community has been able to operate without direct FCC oversight for the past thirty years is because of the self-protecting nature of our operations. Unfortunately, this success has made our industry of small businesses virtually invisible to the proponents of future TV Band Devices that thought the white space spectrum was lying idle. It would be interesting to know how many complaints the FCC has received of interference from wireless audio devices over the years. In the past 16 years of operation, PWS has never been accused of causing interference to a broadcaster and works exhaustively to be a good wireless citizen and avoid causing interference on other wireless audio device users.

In fact, we have made frequency coordination for wireless audio devices a large part of our business. On any large event such as a corporate meeting, there may be one to five large vendors of wireless audio devices. Production managers use our services to coordinate the various wireless systems across the entire event in order to manage the spectrum and increase the reliability of wireless systems for everyone. Our average frequency coordination is 80 frequencies per event and we have successfully managed more than 400 wireless audio devices per event on several occasions.

In our experience, each professional wireless audio device owner/operator has welcomed our frequency coordination services because it has relieved them of the need to perform the duties themselves. All have recognized the need for coordinating frequencies across an event.

Indeed, the question in ¶ 138 refers to frequency coordination requirements of 47 C.F.R. § 74.802 but we submit that 47 C.F.R. § 74.803 has been the 'golden rule' for white space device operation during the past 30 years of use. 74.803 dictates that, "low power auxiliary licensees shall endeavor to select frequencies or schedule operation in such manner as to avoid mutual interference." It also dictates that wireless audio device operation is secondary to TV broadcast and Land Mobile operation and must not cause harmful interference.

Finally, we don't think that the FCC should impose specific restrictions on the amount of bandwidth that is used by a specific live event, performance or broadcast. As we discuss below, the limits imposed on

Part 90 wireless devices completely fail to provide adequate bandwidth or channel count for modern productions and we are concerned that arbitrary limits will impact productions in the same way.

> *¶ 138: "In this Further Notice, we are seeking comment on a limited expansion of the eligibility provisions for Part 74, Subpart H licenses. […]We invite comment on whether some other license term should apply to parties that would be eligible under revised rules. For example, should licenses obtained by a newly eligible person or organization be issued for a term not to exceed ten years from the date of initial issuance or renewal or should some other period be adopted and, if so, what should be the length of the license term?*

We see no reason to request a different licensing term standard. The existing practice of issuing a license for ten years should be adopted.

> *¶ 144: "Similarly, we seek comment on any responsibility that manufacturers, retailers, and distributors should have to notify customers about the licensing requirements or steps they could take ensure that low power auxiliary stations are not marketed to ineligible users. …"*

We feel that limiting purchase of wireless audio devices to Part 74 eligible licensees would not be fair to part 15 eligible users. However, we do recognize that some equipment may exceed the limitations imposed on part 15 users and agree that equipment of that type should only be offered for sale to part 74 eligible users. In order to prevent users from simply 'forgetting' to apply for licenses after a sale, we would be willing to use a Commission provided database to verify Part 74 licenses before a sale.

> *¶ 149: "Finally, we seek comment on any other steps that the Commission should take in the long term to encourage technological improvements with the goal of ensuring that the core TV spectrum, which is shared by many users, is more efficiently used and thus more available to a range of users for new and innovative products and services. Are there approaches to spectrum management, such as authorizing a band manager, that would achieve the efficient use of spectrum by these devices?"*

We recognize that the United Kingdom OfCom has successfully implemented a spectrum management program but argue that the relative geographical and population size differences between the UK and the USA would make such a program unwieldy and impose a large bureaucratic 'tax' on wireless audio device operation.

As mentioned earlier, current professional users of wireless audio devices have been very successful at self-coordinating among themselves to protect both broadcasters and other wireless audio device users for many years. However, one potential long term aspect of the White Space database system may be to encourage and coordinate contact between wireless device users in close proximity and to facilitate self- frequency coordination between local users. In fact, this may be part of a solution to the commissions question posed in FCC 10-16 ¶ 132.

> *¶ 151: "Discussion. We seek comment on steps the Commission should take to revise the Part 90 wireless microphone rules to make them more useful to wireless microphone users. In particular, we seek comment on why relatively few entities operate under the current Part 90 rules. For example, are too few frequencies available under Part 90? Does the narrower bandwidth permitted under Part 90 (54 kHz) as compared to Part 74 (200 kHz) affect the audio quality of Part 90 wireless microphones? Does the Part 90 eligibility or licensing requirements discourage use of Part 90 wireless microphones by some parties? Are Part 90 wireless microphones readily available to entities that wish to purchase them? "*

In part 90, there are eight VHF traveling frequencies. Of the eight, only four can be used at a single location because of Intermodulation. Granted, by interleaving the eight frequencies across different physical areas, you can make use of all eight, there simply isn't enough frequencies to make the effort worthwhile. As mentioned earlier in these comments, our average frequency count per event is 80 frequencies. In our case, customers don't bother using our services when only eight frequencies are required. Also, hardly any manufacturer of wireless audio devices manufactures VHF equipment anymore.

In our opinion, the Part 90 traveling frequencies do not offer enough channels, are not agile enough to avoid interference, are not readily available and the narrow bandwidth and propagation characteristics are not conducive to professional wireless audio device use. For these reasons the Part 90 frequencies haven't been on our radar for the past ten years.

Summary:

Like any engineering problem, many different variables must be balanced to achieve an optimum solution. We urge the Commission to carefully adopt and modify rules under Part 15 and Part 74 that preserve and protect the use of wireless audio devices at the quality level the public is accustomed to experiencing at large and small events on a daily basis. Further, a limited expansion of Part 74, subpart H licensing is essential to prevent interference to the entities we have commented on. To do any less would not be in the public interest and cripple the hundreds of small businesses and thousands of individuals that have quietly provided a fundamental right of the people through the use of wireless audio devices – free speech. We are encouraged by many of the questions on which the FCC has sought comments and look forward to continued participation in the rule making process. If you have any questions regarding this filing, please do not hesitate to contact us.

Respectfully submitted,

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